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February 3, 1999

Office of the Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W.  
TW-A325  
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Dear Ms. Salas:

On behalf of the Wireless Communications Division of the Telecommunications Industry Association ("TIA"), I am writing to withdraw our Petition for Rulemaking, filed October 20, 1998, which requested a rulemaking to allocate the spectrum at 2110 - 2150 MHz to broadband PCS services, often referred to as "Third Generation," or "3G", services. TIA is the principal industry association representing telecommunications equipment manufacturers, including manufacturers of terrestrial mobile radio equipment.

In the Third Notice of Proposed Rulemaking in ET Docket No. 95-18, the Commission made reference to TIA's Petition and proposed to address it separately. However, in light of TIA's support for the decision of the Commission to use ET Docket No. 95-18 to reallocate the spectrum at 2110-2150 MHz and to seek public comment on what services might most appropriately be offered in this spectrum band, TIA believes withdrawing the Petition is in order. TIA believes that to promote efficiency and the conservation of the Commission's resources, it is appropriate to focus all consideration of future use of this spectrum band to within the rulemaking. Thus, we have incorporated the essence of our petition into our comments in ET Docket No. 95-18, which we have filed separately today.

Sincerely,



Eric J. Schimmel  
Vice President

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**Before the**  
**Federal Communications Commission**  
**Washington, D.C. 20554**

In the Matter of	)	
	)	
Amendment of Section 2.106 of the	)	ET Docket No. 95-18
Commission's Rules to Allocate	)	
Spectrum at 2 GHz for Use	)	
by the Mobile-Satellite Service	)	

**Comments of the Wireless Communications Division  
of the Telecommunications Industry Association**

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## SUMMARY

The Wireless Communications Division ("WCD") of the Telecommunications Industry Association ("TIA") supports the decision of the Commission to reallocate the spectrum at 2110-2150 MHz. WCD urges the Commission to allocate this spectrum for broadband PCS services, such as IMT-2000. Such services are the future direction of the wireless industry. They represent an important integrated, multimedia, communications transport environment containing fixed, mobile and satellite components with data speeds ranging from 144 kbps to 2 Mbps that will be offered throughout the world in the very near future. To date there is no available spectrum for this service in the United States which is comparable to that allocated in the other regions of the globe. Only by allocating this spectrum to broadband PCS services can the Commission bring the U.S. into alignment with the rest of the world and, thereby, make possible the economies of scale that global alignment permits. The responsibility to allocate spectrum in the public interest by carefully balancing the various possible uses is central to the Commission's reason for existence. The wireless telecommunications industry has been extremely successful in the United States and sound spectrum management by the FCC is a key element in this development. The Commission's administrative review of possible spectrum allocation options formed the basis upon which companies made the investment decisions that gave birth to this new industry. The stated public policy goal of making broadband PCS services available to the American people on a reasonable and timely basis can now be further advanced by designating the 2110-2150 MHz band for such services.

**Before the  
Federal Communications Commission  
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Spectrum at 2 GHz for Use	)	
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**Comments of the Wireless Communications Division  
of the Telecommunications Industry Association**

**1. Introduction**

The Wireless Communications Division ("WCD") of the Telecommunications Industry Association ("TIA"), submits the following comments in response to the Federal Communications Commission's Third Notice of Proposed Rulemaking in ET Docket 95-18 ("Notice").<sup>1</sup> TIA is the principal industry association representing telecommunications equipment manufacturers, including manufacturers of terrestrial mobile radio equipment.<sup>2</sup> WCD supports the decision of the Commission to reallocate the spectrum at 2110-2150 MHz and commends the Commission for its decision to seek public comment on what services might most appropriately be offered in that spectrum band. As a result of the Commission's initiation of this proceeding, WCD will withdraw

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<sup>1</sup> Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, Memorandum Opinion and Order and Third Notice Of Proposed Rule Making and Order, FCC 98-309 (Released November 27, 1998) ("Notice").

<sup>2</sup> These comments reflect only the views of members of the TIA Wireless Communications Division. Moreover, these comments do not necessarily reflect the views of other divisions, other committees, or other members of TIA.

a Petition for Rulemaking which proposed allocating this spectrum to a broadband PCS service. We have incorporated the essence of our petition into these comments.<sup>3</sup>

In its Notice, the Commission briefly set forth its proposal for this spectrum. It stated that the 1997 Budget Act requires it to reallocate the 40 MHz of spectrum at the 2110-2150 MHz band for assignment by competitive bidding. It emphasized that it may allocate an alternate 40 megahertz of spectrum only if it determines that auction of such alternative spectrum better serves the public interest, convenience and necessity and can reasonably be expected to produce greater receipts. The Commission noted that the 40 MHz specified by Congress for reallocation by auction in the 1997 Budget Act could be used to provide a number of possible Fixed and Mobile Services and it invited comment on the proposed allocation. The Commission also suggested that potential providers of International Mobile Telecommunication - 2000 ("IMT-2000"), a service conceived to provide integrated global mobile communications, may wish to bid for the spectrum.<sup>4</sup>

WCD is convinced that IMT-2000 represents a telecommunications service that will be offered throughout the world in the very near future. It is an important integrated, multimedia, communications transport environment containing fixed mobile and satellite components with data speeds ranging from 144 kbps to 2 Mbps depending on the application. While it will be available in Europe and Asia in the near future, to date it has no available spectrum in the United States which is comparable to that in these other

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<sup>3</sup> In the Notice, the Commission made reference in footnote 64 to the Petition for Rulemaking filed by TIA on October 20, 1998 which requested that the agency allocate the 2110-2150 MHz band to IMT-2000 services, often referred to as "Third Generation," or "3G", services.

<sup>4</sup> See *Id.* at ¶ 30.

regions of the globe. The reasons for this anomaly are discussed below, but allocating adequate spectrum for this service should be among the Commission's highest priorities.

## **2. The Commission's Duty to Allocate in the Public Interest**

The responsibility to allocate spectrum in the public interest is central to the Commission's reason for existence. The Commission's role in establishing our nation's future use of radio spectrum is not primarily as an auctioneer because that role can ultimately be performed by any number of entities, public or private, without the need for the expertise in telecommunications policy that the Commission has developed over the years. Rather the Commission's most important function is to carefully balance the various possible uses and to allocate spectrum to best serve the public interest.

The wireless telecommunications industry has been extremely successful in the United States. Today, a vibrant U. S. market is composed of over 68 million wireless (cellular, PCS and ESMR) subscribers.<sup>5</sup> Underlying these impressive numbers is the safety, utility and convenience that wireless telecommunications bring to consumers and workers. However, sound spectrum management was a key element in the successful development and implementation of all these products and services. Thoughtful spectrum management actions, based on a cooperative public-private review of possible spectrum allocation options, formed the basis upon which companies made decisions regarding investment in technology development and volume manufacturing facilities. These investments gave birth to new products, reduced equipment cost and size and increased quality and features. In turn, operators have access to such products which help

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<sup>5</sup> See the Cellular Telecommunications Industry Association's web page: <http://www.wow-com.com/>

drive the demand for services. As a result, the U.S. consumer today has a broad range of products and services available to fill its communications needs.

We urge the Commission to use this proceeding to reaffirm its allocation function and, for reasons set forth below, to allocate the spectrum at 2110-2150 MHz for a broadband PCS service.

### **3. Background of IMT-2000**

The International Telecommunication Union (“ITU”), at the 1992 World Radio Conference (“WRC”) allocated spectrum bands for Future Public Land Mobile Telecommunications Services (“FPLMTS”). These bands are 1885-2025 MHz, and 2110-2200 MHz (including the satellite allocations). These are the bands currently being targeted around the world for International Mobile Telecommunications-2000 (“IMT-2000”) services, the successor appellation for FPLMTS and often referred to as Third Generation, or “3G”, services. More precisely, the 1920-1980 MHz and 2110-2170 MHz bands have been allocated for the terrestrial component of IMT-2000. Figure 1 shows allocations in the regions of the world most active in IMT-2000 issues.



# 3G Spectrum

All Frequencies in MHz

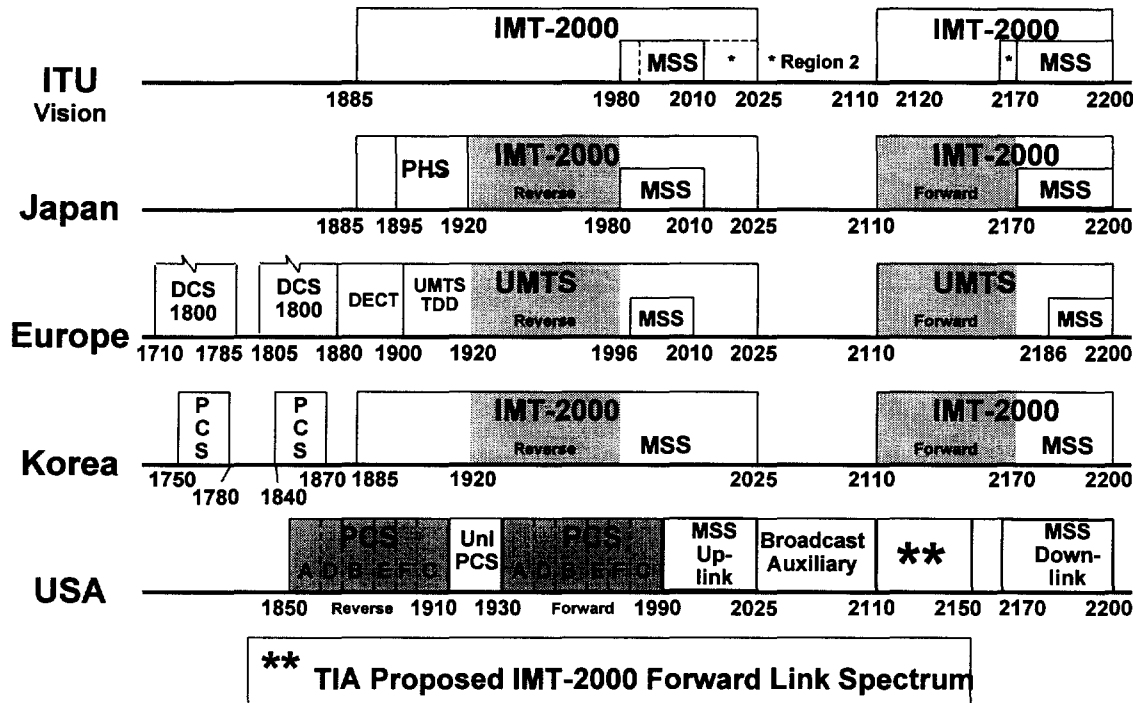


Figure 1

The lower portion of the ITU allocation for IMT-2000 (1885-2025 MHz) overlaps with part of the Personal Communications Services (“PCS”) allocation in the US. The US bandplan uses the 1850-1910 MHz band and the 1930-1990 MHz band for PCS. Therefore, it is not possible for the US to parallel exactly the ITU’s IMT-2000 allocations. As Figure 1 shows, other major markets have followed the ITU plan. However, the allocation in the US of the 2110-2150 MHz band, which aligns with the upper IMT-2000 allocation, to a service envisioned in most 3G scenarios would be a large step towards aligning the US spectrum plan with that of the rest of the globe. This would help US operators to provide those services by giving them, and their subscribers,

access to manufacturers developing products for a global market, and by simplifying their ability to offer global roaming to their customers.

The WCD therefore proposes that the FCC allocate the 2110-2150 MHz spectrum for broadband PCS services. Per the mandate of Congress, licenses for use of the spectrum would be distributed by auction. We believe that auction rules should, however, limit participation to PCS and cellular operators who intend to deploy systems that will deliver 3G services to consumers. In the discussions following, the WCD recognizes that while it has anticipated some of the concerns of operators while giving the perspective of the manufacturing sector, the Commission will no doubt receive direct operator input on these topics. The timing for use of the spectrum will depend on service deployment schedules which are the prerogative of operators/service providers and will depend on such factors as market demand for particular services. Additionally, deployment of services will also depend on completion of the IMT2000 standards, and completion of technology development for infrastructure and terminal equipment. Technology development for the manufacturers can be simplified if the spectrum designations (including those to be determined through WRC 2000) are known well in advance.

#### **4. This designation is in the interest of U.S. industry**

##### **4.1. Next generation PCS technologies will require wider bandwidths**

Since implementation of the US PCS bandplan effectively means that the “U.S. has already licensed Third Generation Mobile Service providers”<sup>6</sup>, it will likely be left to

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<sup>6</sup> See Richard Engleman, FCC/OET Tutorial “Third Generation Mobile Systems: Around the World with IMT-2000”, May 12, 1998

these providers to deploy the technologies which will deliver 3G services to the US consumer. Those services will range from the current 2G offerings such as toll-quality voice and short messaging to more sophisticated high-speed switched data and video services. Most cellular and PCS service providers and manufacturers envision an evolution of subscriber and infrastructure technology to fulfill these new broadband service models.

The rapid convergence of centralized circuit-switched telecommunication and distributed packet-switched data communication networks will play a key role in defining the applications that will run on these 3G networks. Many of these applications will deliver corporate intranet or public Internet data to mobile or nomadic consumers and, therefore, they will be inherently asymmetric in terms of bandwidth requirements. While mobile-to-base (“uplink” or “reverse link”) requests are likely to be short and require less bandwidth, base-to-mobile (“downlink” or “forward link”) transmissions are likely to be large data transfers requiring more bandwidth.

The natural evolution of current 2G systems and technologies to 3G capabilities is likely to require increased downlink capacity. The 2110-2150 MHz band should be designated to allow augmentation of the downlink spectrum currently available to cellular and PCS operators. For example, in a PCS migration example, relatively short requests for data in the 1850-1910 MHz band will result in data flows which will place severe demands on the capacity of the 1930-1990 MHz band. This designation to alleviate congestion will be necessary as current licensees are going to upgrade their systems to deliver 3G services.

#### **4.2. Spectrum misalignment is detrimental to US manufacturers**

Spurred by the activity in the ITU, manufacturers around the world are developing technologies that will satisfy the ITU definition of IMT-2000, including the aforementioned spectrum allocations. As they do this, they anticipate leveraging their research and development investments across a global marketplace. As demonstrated below, the radio frequency ("RF") subsystem will have the largest impact on whether or not IMT-2000 terminal devices can, in fact, take advantage of this global market. The elements which are required in order to create a complete IMT-2000 subscriber device are the RF subsystem and the signal processing and call processing functions. Historically, the call processing and baseband signal processing functions have been implemented in programmable digital logic circuitry. Digital circuits have rapidly advanced to lower cost, lower power, and smaller designs. These trends are expected to continue. Well before 2002, general-purpose digital signal processors will be available which will operate near one volt with speeds exceeding 200 MHz (approximately 400 MIPS for dual-ALU<sup>7</sup> processors) and consuming only 0.1 mW/MHz. On the other hand, RF processing has not seen similar rapid advances and is not expected to advance in the future as rapidly as the digital solutions. Therefore, changing the RF subsystem to accommodate multiple bands will be a significant effort for manufacturers. With much of the rest of the world in agreement on a spectrum plan for IMT-2000, it is incumbent upon the FCC to align the US, as much as possible, with that international agreement. Because of the PCS bandplan, complete alignment will not be possible. However, even the partial

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<sup>7</sup> Arithmetic and Logic Unit.

alignment of 2110-2150 MHz for broadband wireless systems vastly improves the possibility of producing equipment that is capable of providing advanced telecommunications services in both the US wireless and IMT-2000 bandplans.

#### **5. This designation is in the interest of the US consumer**

As mentioned previously, the spectrum in which the IMT-2000 devices will operate dictates the makeup of the RF subsystem of the devices. The RF components are not undergoing the type of rapid advances being seen by the digital subsystems. This means that, without common or nearly common spectrum allocations around the world, consumers will pay a penalty in size, weight, and performance of subscriber terminals because of the RF components.

IMT-2000 systems are currently being designed to handle a large class of terminal devices ranging from voice-only phones to full motion video devices. Not only have current users of cellular phones become accustomed to small, low cost, long standby and talk time phones, but the market's expectation is that the low tier IMT-2000 devices designed for voice-only phone operation will not be significantly larger, more expensive or have poorer operational characteristics than today's cellular phones. Also, the higher tier devices capable of full motion video or services that require high data rates are not envisioned to be vastly larger than existing cellular or PCS phones. As described above, it is the RF components in the devices which will be critical to manufacturers' capabilities to satisfy these customer expectations. Because of the advances in the digital components relative to the RF, the RF processing section will significantly impact the IMT-2000 terminal in terms of its size and cost. If a single device needs to cover multiple frequency bands, the solution is likely to be that of current multi-band cellular

phones, which duplicate receiver front end processing and some of the transmitter processing.

Duplication of equipment leads to larger, heavier, more expensive devices. Thus, separate allocations for different services will clearly have a detrimental impact on the size, cost and power consumption of terminals that will be required to span multiple bands. These factors directly affect the marketability of these products in the U.S., where manufacturers and consumers share a common goal of rapid market acceptance in order to reduce costs and increase services. An optimum spectrum allocation strategy to accomplish this would be enough continuous spectrum for all envisioned service classes. If regional or national allocations are necessary, these should be as close to the international allocations as possible.

In addition to improved economies of scale which benefit the consumer through access to more competition and lower prices, a worldwide alignment of spectrum improves the opportunity to provide subscriber units which can roam on systems throughout the world. IMT-2000 subscriber units operating in the rest of the world will already be capable of operation in the 2110-2150 MHz band, as well as in the downlink part of the US PCS spectrum (1930-1990 MHz). If the designation proposed here is accepted, the expansion of the capability of such phones to cover the US PCS uplink band (1850-1910 MHz) would be all that would be required to create a subscriber unit with the RF capability of global roaming.

## **6. This designation is justified on technological grounds**

As emphasized above, even partial alignment of the US 3G spectrum with that of the rest of the world will be essential for both US manufacturers and consumers to benefit from worldwide economies of scale, and to enable global roaming. The most likely application scenarios for IMT-2000 also advocate for the proposed designation. It is extremely difficult, if not impossible, to predict what applications will drive the demand for advanced, mobile, wireless services. The best that can be done is to design a flexible, scalable system which can adapt to any needs. However, it is reasonable to look to the current drivers of growth in telecommunications and anticipate that they will be significant for wireless systems in the future. It is undeniable that the Internet has had a profound effect on growth in the information technology and telecommunications industries. There is a demand for high speed (and therefore higher bandwidth) connections being driven by private consumers' and businesses' desires to access information on the Internet. Much of this traffic is asymmetric in nature. That is, a small information request sent to an information server (requiring little bandwidth) results in a large amount of data being sent from the server to the subscriber (requiring more bandwidth for acceptable speeds.)

Third generation systems anticipate the convergence of the telecommunication and data communication networks. Users expect that many of the applications on these networks will be delivering Internet or intranet data to a mobile subscriber. Therefore, it is reasonable to assume that asymmetric applications will be a key element of the 3G offerings. Coupling this with the fact that it is existing PCS and cellular operators who likely will be providing 3G services in the US lends more technical support to the

requested designation. Those operators currently have symmetric uplink and downlink spectrum. Designating the 2110-2150 MHz band to enable additional downlink capacity for these operators would be useful to provide for the anticipated offerings.

## **7. Merits of Tailored Auctions**

For all of the above reasons, the WCD believes that it is wise public policy to designate the 2110-2150 MHz band specifically for the deployment of broadband systems which will deliver 3G services. An auction tailored for this purpose is consistent with the FCC's responsibility as manager of the nation's spectrum resource. Although the use of auctions as a mechanism for assigning spectrum licenses can expeditiously and efficiently put the spectrum into the hands of the user who values it the most, it is our observation that auctions in which the FCC provides guidance as to the intended use of the spectrum produce the most favorable results in terms of spectrum usage and revenue. The FCC is well situated, both in terms of its own expertise and by its ability to create a public record, to determine the most appropriate types of systems for a particular portion of the spectrum. The Commission is able to evaluate a broad variety of factors, including technical ones (e.g. mobile applications require lower frequency allocations) as well as prevailing market conditions (e.g. the market is ripe for wireless alternative in the local loop.) When the FCC has exercised this responsibility and tailored the auction accordingly, bidding for the spectrum is brisk and there is valid reason for optimism that the spectrum will be well used to serve the public. Examples are the original PCS auctions, the SMR auction, and the auctions at 220 MHz.

On the other hand, when the Commission allows the auction to define the services so that it becomes an allocation rather than an assignment process (so called "maximum



flexibility”), the auctions have been less successful. Here we are thinking of the WCS auction, and the recently postponed GWCS auction. Manufacturers will develop competitive products for viable, competitive services. We do not want the Commission to choose a particular standard for the 2110-2150 MHz band. In fact, based on existing cellular and PCS systems operating in the US, several systems using different standards appears inevitable. We do, however, urge the Commission to designate the spectrum for a particular use, i.e., broadband PCS, as was done originally for PCS.

In summarizing it’s views about tailoring the auction process, the WCD could not agree more with Commissioner Ness who recently stated:

Auctions, however, are not a substitute for the allocation process. In other words, we should not—indeed, we must not—back away from our fundamental duty to allocate and reallocate spectrum in broad categories in accordance with the public interest.

This is so for both policy as well as pragmatic reasons. The value to the public of certain uses of the spectrum does not always translate into pure economic terms.

For example, we need to ensure that adequate spectrum is available for public safety purposes, for unlicensed – that is, Part 15 -- uses, for the amateur service, and for experimental and scientific purposes. None of these needs would be met if auctions displaced judgment in the spectrum allocation process.

Indeed, all of these spectrum uses serve the public interest. They are fundamentally different and merit different rules and allocation strategies. One size does not fit all.

A final point about spectrum allocations. Government also needs to retain the ability to readjust allocations on a large scale to reflect broad changes in international allocations,


technological developments, and fundamental shifts in demand.<sup>8</sup>


## 8. Conclusion

The stated public policy goal of making advanced telecommunications services available to the American people on a reasonable and timely basis<sup>9</sup> can be advanced by wise spectrum management decisions. Designating the 2110-2150 MHz band for 3G types of broadband PCS services will not only make U.S. technology more available to the rest of the world, but will, more importantly, put the economies of scale available in a worldwide market to work for American consumers.

Respectfully submitted,

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<sup>8</sup> Remarks by Commissioner Susan Ness Before PCIA's PCS '98, Orlando, FL, September 23, 1998

<sup>9</sup> See 47 U.S.C. § 706(a).